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Case report

Floaters and reduced contrast sensitivity after successful pharmacologic vitreolysis with ocriplasmin

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ABSTRACT

Purpose: To describe the onset of floaters and reduction in contrast sensitivity (CS) following successful pharmacologic vitreolysis with ocriplasmin for the treatment of vitreo-macular traction (VMT) in a patient with previously normal CS.

Observations: A 65-year-old woman with a past ocular history of normal visual acuity (VA = 20/26) and contrast sensitivity (1.81% Weber) presents with a 4-month history of distortions. VA decreased to 20/40 and Optical Coherence Tomography (OCT) demonstrated VMT. Pharmacologic vitreolysis was performed with intravitreal ocriplasmin. Ten weeks later the patient complained of floaters and was found to have a PVD and complete resolution of VMT. VA was still 20/40, but contrast sensitivity decreased by more than 100% to 3.77%Weber. After 6 months of attempted coping, this did not improve, so limited vitrectomy was performed. Post-operative VA = 20/26 and CS improved by 46% from 3.77%W to 2.03%W (normal).

Conclusion: and importance: This case highlights a little discussed consequence of PVD induction by successful pharmacologic vitreolysis – the development of clinically significant floaters. The resulting reduction of contrast sensitivity was normalized by limited vitrectomy, strongly suggesting that the detached vitreous was the cause.

1. Introduction

Anomalous posterior vitreous detachment (PVD) causes a range of macular disorders, including vitreo-macular traction (VMT).[1] For decades, vitrectomy has been the only therapeutic modality. Recently, however, pharmacologic vitreolysis has become available as a non-surgical approach to treat VMT and macular holes.[2,3] The first approved drug for pharmacologic vitreolysis is ocriplasmin, a truncated form of the human serine protease plasmin. This non-specific protease has both *liquefactant* activity to liquefy gel vitreous[3,4] and *interfactant* properties that weaken vitreo-retinal adhesion, both necessary to induce PVD.[2–4] Results of preclinical[5] and clinical[6] studies have shown that intravitreal ocriplasmin injection can induce PVD and relieve VMT. Some patients, however, experience disturbed vision following injection, and the etiology is not always clear.[7–9] The objective of this case report is to analyze a potential untoward effect of pharmacologic vitreolysis for VMT – the development of subjectively bothersome floaters with objective reduction of contrast sensitivity.

The following presents a case of clinically significant floaters that developed following pharmacologic vitreolysis for VMT with ocriplasmin. The etiology is identified as PVD and the impact on vision is assessed objectively using contrast sensitivity testing that yields quantification known as the Weber index[10,11]:

$$\%W = [\text{Luminance}_{max} - \text{Luminance}_{min}]/\text{Luminance}_{max}$$

2. Case report

The patient provided written consent for publication of personal information including medical record details and photographs.

On initial presentation, a 65-year-old woman with hypothyroidism, hypertrophic cardiomyopathy, hypertension, and hypercholesterolemia was diagnosed with asymptomatic vitreo-macular adhesion (Fig. 1A). The patient did not complain of subjective

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distortions and there were no abnormalities on Amsler grid testing. Best corrected (−4.75−0.75 × 38) ETDRS visual acuity (BCVA) measured 20/26-2.

One year later the patient presented with the chief complaint of decreased vision with distortions. BCVA was 20/40 and SD-OCT (Optos, Mass) showed anomalous PVD with significant vitreo-foveal traction, a central macular cyst, and macular thickening to 345μm (Fig. 1B). Pharmacologic vitreolysis was performed with intravitreal ocriplasmin. One week after injection, BCVA remained 20/40 and OCT showed persistent vitreo-foveal traction with macular cysts. Ten weeks later, the patient noted the sudden onset of floaters. SD-OCT imaging showed vitreo-foveal separation (Fig. 1B) with release of traction and a 95 μm decrease in macular thickening (345μm to 250 μm) (Fig. 1B,C). The patient was advised to try coping with the floaters.

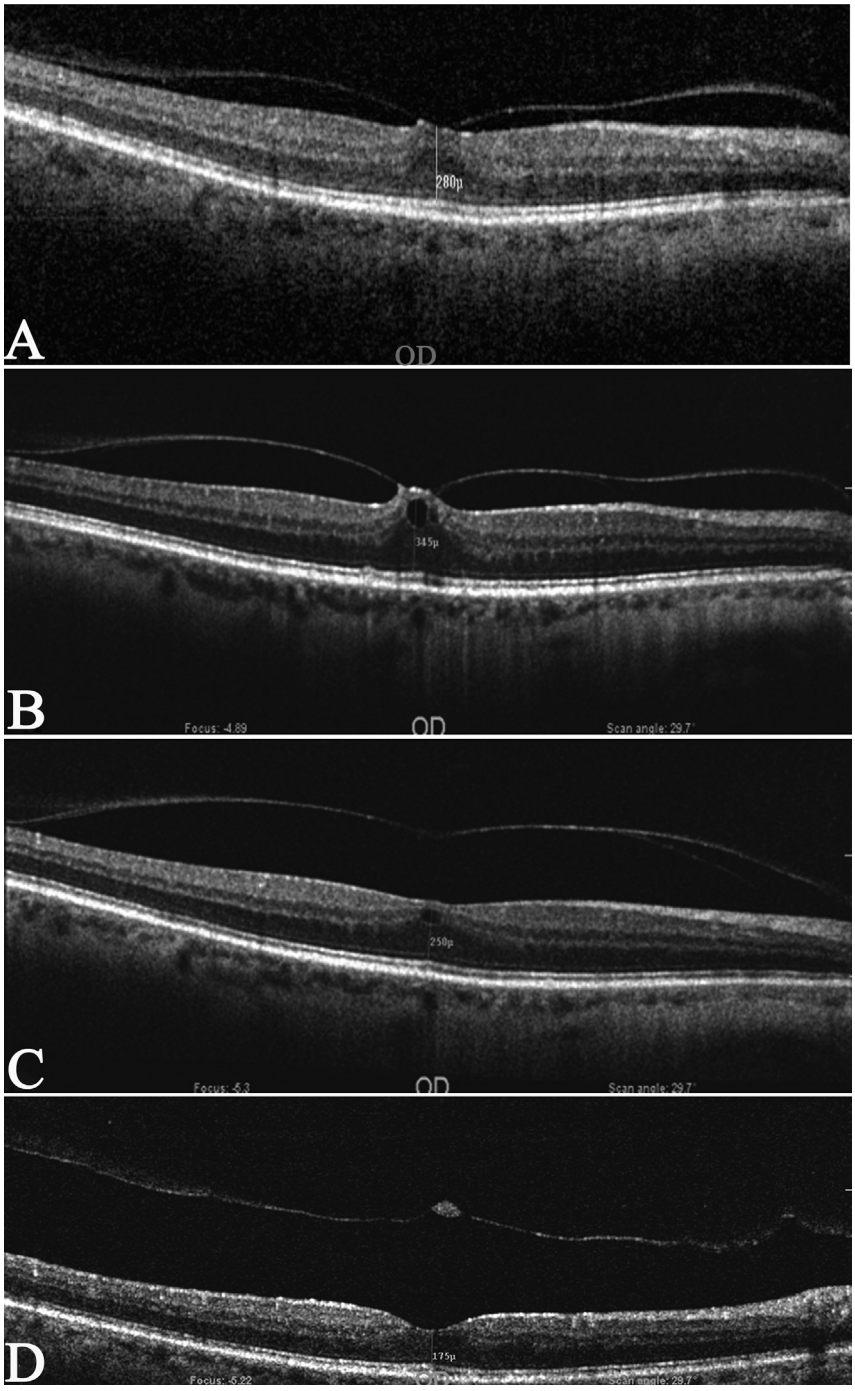

Fig. 1. A: SD-Optical Coherence Tomography image shows vitreo-macular adhesion with foveal thickening of 280 μm. B: SD-OCT imaging shows anomalous PVD with vitreo-macular traction with macular cysts and foveal thickening to 345 μm. C: SD-OCT imaging shows the release of vitreo-macular traction 10 weeks after pharmacologic vitreolysis with ocriplasmin. A reduction in macular cysts can be seen as well as reduced macular swelling from 345 μm to 250 μm in the foveal region. D: SD-OCT imaging 4 months after pharmacologic vitreolysis with ocriplasmin shows disappearance of macular cysts and significant reduction in thickening to 175 μm. However, there was PVD with a dense opacity on the detached posterior vitreous cortex in front of the fovea.

Table 1
Chronology of changes in contrast sensitivity from normal baseline to abnormal levels following pharmacologic vitreolysis, then back to normal after limited vitrectomy.

Normal baseline	Post-pharmacologic vitreolysis induced PVD	Post-vitrectomy
1.81% W	3.77% W (9 months post-injection)	2.03% W (3 months post-vitrectomy)

Nine months post-injection the patient's subjectively bothersome floaters persisted and contrast sensitivity (CS) was diminished from 1.81%Weber (prior to PVD) to 3.77%Weber, which is within the range of abnormal CS levels that were previously shown to respond to surgical intervention.[11,12] SD-OCT imaging revealed resolution of VMT, but there was PVD with a dense vitreous opacity in the detached posterior vitreous cortex (Fig. 1D).

Given the chronicity of the floaters, the patient's considerable subjective dissatisfaction with vision, and the objective finding of diminished contrast sensitivity, limited vitrectomy was performed.[11–13] 2 weeks after surgery contrast sensitivity improved by 46% from 3.77%W pre-op to 2.03%W post-op. Acutely, CS remained normal at 1 month, and 3 months. Long-term follow-up showed that 1.5 years after vitrectomy CS was still normal at 2.43%Weber.

3. Discussion

More than four decades ago, Parel, Machemer, and Buettner invented vitrectomy surgery,[14] which has since been the mainstay of therapy for VMT and other vitreo-retinal disorders. However surgery is now being replaced in some circumstances by pharmacologic vitreolysis,[2–6] as approved by the US FDA and European EMA with ocriplasmin to treat patients with symptomatic vitreomacular adhesion and VMT, with or without macular hole. Some post-marketing reports[8,9] have linked ocriplasmin to acute, transient visual dysfunction, which in most (but not all) cases resolve. Floaters were experienced by as many as 17% of patients in pre-approval clinical trials.[6] In the MIVI-TURST trials, 13.4% of patients treated with Ocriplasmin had a total PVD, while only 3.7% of the placebo group presented with PVD by the primary end point. In addition, of those that were treated with Ocriplasmin (n = 465), 16.8% reported developing vitreous floaters, while only 7.5% of the placebo group (n = 187) reported having floaters.[7] The number of those that were successfully treated patients who developed floaters was not specified, compared to those that were not successful.

The case reported herein developed PVD following successful pharmacologic vitreolysis, but there were subjectively bothersome floaters. Although there was therapeutic resolution of VMT, the floaters were associated with diminution of previously documented normal contrast sensitivity. (See Table 1).

Past studies have identified PVD as the cause of clinically significant floaters in two-thirds of cases, with diminution in CS on the order of 67%, on average.[11] Fortunately, this and other studies[12,13] found that CS can be restored back to normal with vitrectomy, as was the case with the patient reported herein. But the effects of vitrectomy are not the point of this case report. This aspect is presented solely to demonstrate that the restoration of CS to normal levels following vitrectomy strongly implicates vitreous as the cause of decreased CS following successful pharmacologic vitreolysis, in this case with ocriplasmin.

4. Conclusions

The case reported herein provides evidence that the induction of PVD by pharmacologic vitreolysis with ocriplasmin can induce clinically significant floaters and reduce previously normal contrast sensitivity. Removal of the vitreous resulted in resolution of the floater symptoms and restored contrast sensitivity to normal.

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Conflicting interests

The authors have no competing or conflicting interests.

Disclosure

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References

1. Sebag J, Niemeyer M, Koss M. Anomalous PVD and vitreoschisis. In: Sebag J, ed. *Vitreous – in Health & Disease*. New York: Springer; 2014:241–264.
2. Sebag J. Pharmacologic vitreolysis. *Retina*. 1998;18:1–3.
3. Sebag J. Pharmacologic vitreolysis – premise and promise of the first decade. *Retina*. 2009;29:871–874.
4. Sebag J. Molecular biology of pharmacologic vitreolysis. *Trans Am Ophthalmol Soc*. 2005;103:473–494.
5. deSmet M, Jonkcx B. Pharmacologic vitreolysis with ocriplasmin: basic science studies. In: Sebag J, ed. *Vitreous – in Health & Disease*. New York: Springer; 2014:845–852.
6. Stalmans P. Pharmacologic vitreolysis with ocriplasmin – clinical studies. In: Sebag J, ed. *Vitreous – in Health & Disease*. New York: Springer; 2014:853–862.
7. Stalmans P, Benz MS, Gandorfer A, et al. Enzymatic vitreolysis with ocriplasmin for vitreomacular traction and macular holes. *N Engl J Med*. 2012;367:606–615.
8. Kim JE. Safety and complications of ocriplasmin: oh, how safe art thou? *JAMA Ophthalmol*. 2014;132(4):379–380.
9. Hahn P, Chung MM, Flynn Jr HW, et al. Safety profile of ocriplasmin for symptomatic vitreomacular adhesion: a comprehensive analysis of premarketing and post-marketing experiences. *Retina*. 2015;35(6):1128–1134.
10. Bach M. The freiburg visual acuity test – variability unchanged by post- hoc re analysis. *Graefe's Arch Clin Exp Ophthalmol*. 2007;245(7):965–971.
11. Sebag J, Yee KMP, Huang L, Wa C, Sadun AA. Vitrectomy for floaters – prospective efficacy analyses and retrospective safety profile. *Retina*. 2014;34:1062–1068.
12. Milston R, Madigan M, Sebag J. Vitreous floaters – etiology, diagnostics, and management. *Surv Ophthalmol*. 2016;61(2):211–227.
13. Huang LC, Yee KMP, Wa CA, Nguyen JN, Sadun AA, Sebag J. Vitreous floaters and vision: current concepts and management paradigms. In: Sebag J, ed. *Vitreous – in Health & Disease*. New York: Springer; 2014:771–788.
14.. Parel J-M. The history of vitrectomy. In: Sebag J, ed. *Vitreous – in Health & Disease*. New York: Springer; 2014:665–692.